WHAT IS CLAIMED IS:

1. A cooling device for an internal stator of an electric machine, the stator including a substantially cylindrical cavity defining a substantially cylindrical internal surface, said cooling device comprising :

a body defining an external substantially cylindrical contact surface; and

a biasing element connected to said body;

wherein said biasing element is so configured and sized as to bias said contact surface of said body against the internal surface of the rotor when said cooling device is positioned inside the cavity.

2. A cooling device as defined in claim 1, wherein said body includes a cooling passageway configured to receive a circulating cooling fluid, said cooling passageway including an inlet and an outlet.

3. A cooling device as defined in claim 2, wherein said cooling passageway includes a cooling conduit extending through said body.

4. A cooling device as defined in claim 2, wherein said cooling passageway includes an indentation in said contact surface, said indentation being configured and sized to receive a cooling tube.

5. A cooling device as defined in claim 2, wherein said cooling passageway is arranged in a generally serpentine geometric configuration between said inlet and said outlet.

6. A cooling device as defined in claim 1, wherein said body is generally C-shaped and defines a gap, said gap being delimitated by first and second opposed surfaces.

7. A cooling device as defined in claim 6, wherein said biasing element is so configured and sized as to bias said contact surface of said body against the internal surface of the rotor when said cooling device is positioned inside the cavity by exerting an expansion force on said first and second opposed surfaces.

8. A cooling device as defined in claim 7, wherein said biasing element includes at least one expansion spring connected to and positioned between said first and second opposed surfaces.

9. A cooling device as defined in claim 8, wherein said at least one expansion spring includes a leaf-spring having first and second opposed ends each connected to one of the opposed surfaces.

10. A cooling device as defined in claim 9, wherein said first and second opposed surfaces each include a respective generally T-shaped protrusion, said generally T-shaped protrusions being so configured and sized as to retain said at least one leaf-spring by each enclosing one of said ends thereof.

11. A cooling device as defined in claim 9, wherein said first and second opposed surfaces each include at least one longitudinally extending notch, said at least one longitudinally extending notch being so configured and sized as to receive one end of said at least one leaf-spring.

12. A cooling device as defined in claim 9, wherein:

said first opposed surface includes two longitudinally extending notches, each said longitudinally extending notches being so configured and sized as to receive one end of a leaf-spring; and

said leaf-spring contacts said second opposed surface along a longitudinal line located substantially at midpoint between said first and second ends.

13. A cooling device as defined in claim 8, wherein:

said at least one expansion spring includes a coil spring having first and a second ends;

said first and second opposed surfaces each include a shoulder; each shoulder are configured and sized to receive one of said first and second ends of said coil spring.

14. A cooling device as defined in claim 7, wherein said first and second opposed surfaces are convex.

15. A cooling device as defined in claim 14, wherein said biasing element includes first and second wedging devices, said first and second wedging devices being at least in part located between said first and second opposed convex surfaces.

16. A cooling device as defined in claim 15, wherein each of said first and second convex surfaces have a substantially trapezoidal cross-section.

17. A cooling device as defined in claim 16, wherein each trapezoidal cross-section is defined by a flat surface and two angled surfaces; the flat surfaces of each trapezoidal cross-section facing each other.

18. A cooling device as defined in claim 17, wherein said first and second wedging devices each have a trapezoidal cross-section.

19. A cooling device as defined in claim 18, wherein each trapezoidal cross-section wedging device is defined by a flat surface and two angled surfaces; the flat surfaces of each wedging device facing each other.

20. A cooling device as defined in claim 19, wherein said biasing element includes a fastening assembly for removable fastening said first wedging device to said second wedging device.

21. A cooling device as defined in claim 20, wherein said fastening assembly includes a deformable and biasing portion, said deformable portion transmitting a reaction force to said first and second wedging devices.

22. A cooling device as defined in claim 21, wherein said fastening assembly further includes a bolt and a nut; said first and second wedging devices include respectively first and second fastening holes configured and sized to receive said bolt; said deformable portion being mounted between one of the wedging devices and said nut to thereby biais said first and second wedging devices towards one another.

23. A cooling device as defined in claim 22, wherein said deformable portion transmitting a reaction force to said first and second wedging devices includes a disc spring inserted onto said bolt between said first wedging device and said nut.

24. A cooling device as defined in claim 23, wherein said disc spring includes at least one Belleville spring washer.

25. A cooling device as defined in claim 20, wherein said fastening assembly includes a plurality of fasteners for attaching said first wedging device to said second wedging device.

26. A cooling device as defined in claim 1, wherein said biasing element includes a spring integral with said body.

27. A cooling device as defined in claim 26, wherein said spring integral with said body includes:

a first longitudinal cut tangential to said external surface, said first cut defining a first channel within said body; and

a second longitudinal cut tangential to said external surface, said second cut defining a second channel within said body;

wherein said first and second channels allow an elastic deformation of said spring integral with said body.

28. A cooling device as defined in claim 1, wherein:

the stator includes a key extending from the internal surface; and

said body includes a keyway configured to engage the key, thereby preventing a rotational motion of said cooling device in said cavity.

29. A cooling device as defined in claim 1, wherein:

said body includes first and second body elements; and

said biasing element interconnects said first and second body elements.

30. An electric machine comprising a cooling device for an internal stator of an electric machine, the stator including a substantially cylindrical cavity defining a substantially cylindrical internal surface, said cooling device including:

a body defining an external substantially cylindrical contact surface; and

a biasing element connected to said body;

wherein said biasing element is so configured and sized as to bias said contact surface of said body against the internal surface of the rotor when said cooling device is positioned inside the cavity.

31. A cooling device for an internal stator of an electric machine, the stator including a substantially cylindrical cavity defining a substantially cylindrical internal surface, said cooling device comprising :

a body defining an external substantially cylindrical contact surface; and

biasing means connected to said body, said biasing means being so configured and sized as to bias said contact surface of said body against the internal surface of the rotor when said cooling device is positioned inside the cavity.

32. A cooling device for an internal stator of an electric machine, the stator including a cavity defining an internal surface, said cooling device comprising:

a body defining an external contact surface; and

a biasing element connected to said body;

wherein said biasing element and said body are so configured and sized as to bias said contact surface of said body against the internal surface of the rotor when said cooling device is positioned inside the cavity.